

## The first record of *Spiricoelotes zonatus* (Peng & Wang 1997) (Araneae: Amaurobiidae) from Japan

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**Abstract** — *Spiricoelotes zonatus* (Peng & Wang 1997) originally described from Hunan Province, China is newly recorded in Japan, and described on the basis of the specimens collected from an artificial cave in Glover Garden, Nagasaki City, Nagasaki Prefecture. The spider is distributed in the eastern part of China and is regarded as a naturalized species in Japan, which was artificially introduced by ships from China.

**Key words** — *Spiricoelotes*, Araneae, new record, naturalized species, Glover Garden, Nagasaki, Japan

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The genus *Spiricoelotes* is characterized by having a slender, spiraled conductor and strongly curved patellar apophysis in male palp, and long, strongly convoluted spermathecae in female genitalia (Shimojana 1989, 2003; Peng & Wang 1997; Wang 2002, 2003). It can be clearly distinguished by these characteristics from other coelotine genera. Until now, three species of the genus *Spiricoelotes* were described from eastern Asia, one of them is from Japan and two are from China (Wang 2003; Platnick 2007).

*Spiricoelotes zonatus* (Peng & Wang 1997) was first described with the specimens collected from Changsha City, Hunan Province, China, and then, it was recorded from Jiangsu, Shanxi, Hubei and Sichuan Provinces of the eastern region of China up to the present (Peng & Wang 1997; Chen & Zhao 1997; Wang 2003). Judging from this distribution, this species seems to have been endemic to China. However, I collected some specimens from the Glover Garden, Nagasaki City, Nagasaki Pref., Japan, and recognized that they belong to *S. zonatus*, which is new to the Japanese fauna. In the present paper, this species is described using these Japanese materials and a presumptive way of naturalization of this species from China to Japan is discussed.

The abbreviations used in this paper are as follows: ALE, anterior lateral eye; AME, anterior median eye; MOA, median ocular area; PLE, posterior lateral eye; PME, posterior median eye.

The voucher specimens used for this study are deposited in the collection of the Department of Zoology, National Museum of Nature and Science, Tokyo.

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### *Spiricoelotes zonatus* (Peng & Wang 1997) (Figs. 1–4)

*Coelotes zonatus* Peng & Wang 1997, p. 331, figs. 32–36; Song, Zhu & Chen 1999, p. 388, figs. 226O, P, 227P, 229B.

*Coelotes laoyingensis* Chen & Zhao 1997, p. 89, figs. 5, 6; Song, Zhu & Chen 1999, p. 376, figs. 220N, O.

*Spiricoelotes zonatus*: Wang 2002, pp. 131–133, figs. 360–374; Wang 2003, pp. 565–566, figs. 80A–E, 97I, map 29.

Specimens examined. Glover Garden, Nagasaki City, Nagasaki Pref., Japan, 2♀, June 19, 2005; 1♀, August 12, 2005; 2 juveniles, October 8, 2006; 1♂, November 23, 2007, K. Okumura leg.

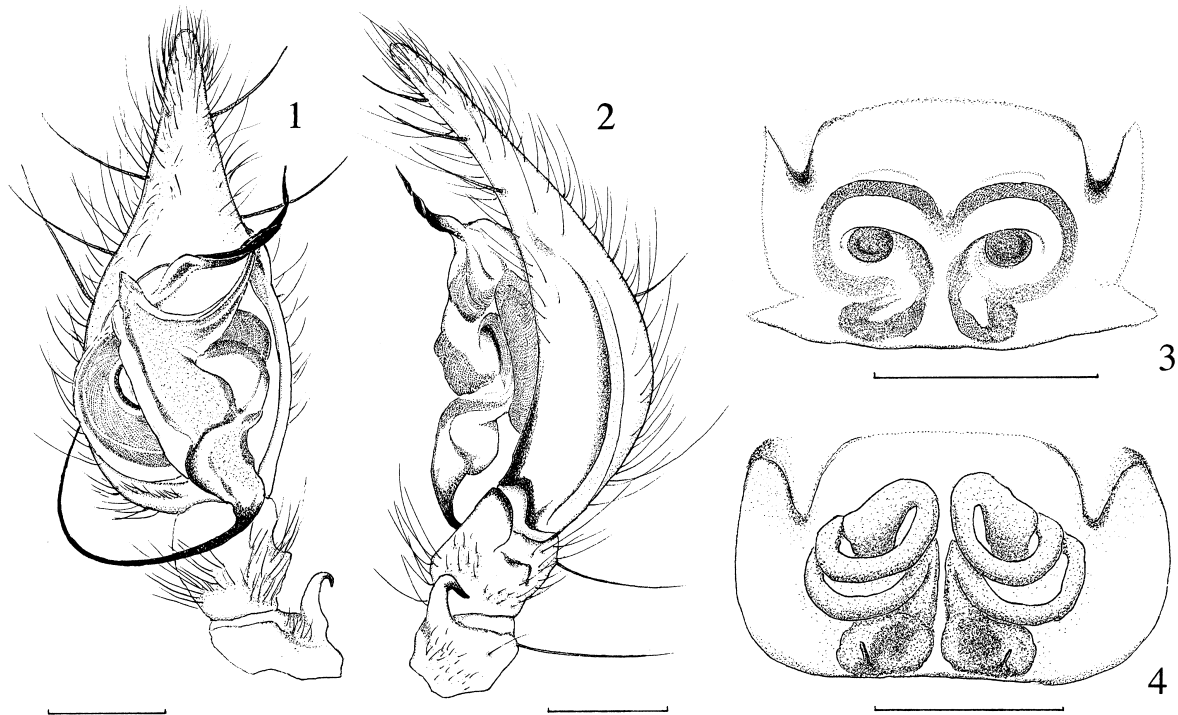
Description (one male and one female from the above specimens were used). Male. Measurements in mm: Total length 8.2; carapace 4.0 long, 2.6 wide; abdomen 2.2 long, 2.1 wide; sternum 2.8 long, 2.6 wide. Eye sizes: AME 0.17, ALE 0.18, PME 0.17, PLE 0.13. Distances between eyes: AME–AME 0.03, AME–ALE 0.03, PME–PME 0.10, PME–PLE 0.12, AME–PME 0.07, ALE–PLE 0.03. MOA: anterior width 0.37, posterior width 0.44, length 0.41. Leg measurements as shown in Table 1.

Chelicera: retromargin with five teeth.

Male palp (Figs. 1, 2): embolus comparatively long, conductor slender, pointed and spiraled, patellar apophysis hook-shaped, lateral tibial apophysis small.

Coloration: carapace yellowish brown, dorsum of abdomen grayish brown with yellowish brown chevrons, sternum yellowish brown with dark brown edges, chelicerae and maxillae reddish brown, labium brown, legs yellowish brown with no ring flecks.

Female. Measurements in mm: Total length 5.9; carapace 2.5 long, 1.9 wide; abdomen 3.3 long, 2.2 wide;



**Figs. 1–4.** *Spirioelotes zonatus* (Peng & Wang 1997) — 1, Male palp, ventral view; 2, same, retrolateral view; 3, epigynum; 4, internal female genitalia. Scales: 0.5 mm.

**Table 1.** Leg measurements of *Spirioelotes zonatus* (♂/♀, in mm).

Legs	Femur	Patella and tibia	Metatarsus	Tarsus	Total
I	3.24/3.12	4.08/4.12	3.16/2.80	2.04/1.92	12.52/11.96
II	2.88/3.00	3.60/3.48	2.72/2.68	1.80/1.72	11.00/10.88
III	2.56/2.68	3.28/3.16	2.96/2.68	1.60/1.56	10.40/10.08
IV	3.48/3.52	4.36/4.20	4.24/4.00	2.12/1.96	14.20/13.68

sternum 1.4 long, 1.3 wide. Eye sizes: AME 0.10, ALE 0.15, PME 0.13, PLE 0.13. Distances between eyes: AME-AME 0.06, AME-ALE 0.03, PME-PME 0.11, PME-PLE 0.11, AME-PME 0.10, ALE-PLE 0.04. MOA: anterior width 0.26, posterior width 0.37, length 0.33. Leg measurements as shown in Table 1.

Chelicera: retromargin of left chelicera with four teeth, and that of right one with five.

Epigynum and internal genitalia (Figs. 3, 4): hoods situated anterolaterally in epigynal plate strongly depressed, atrium with arc-shaped atrial slit, M-shaped band around the atriums, epigynal teeth absent, spermathecae long, slender and intensely convoluted.

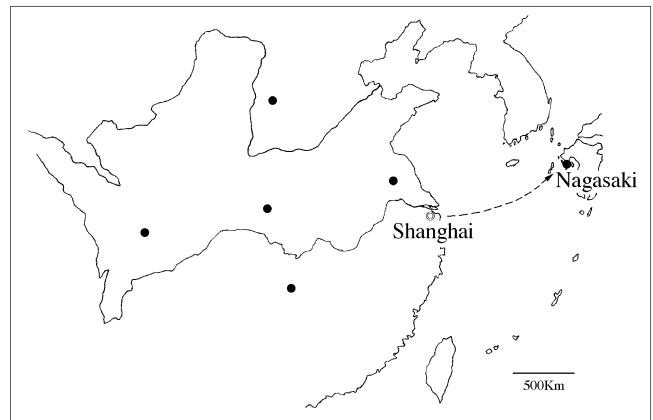
Coloration: almost same as in the male.

Distribution. Japan (Nagasaki City), China (Hubei, Hunan, Jiangsu, Shanxi, and Sichuan Provinces).

Remark. Intraspecific variation occurs in the number of teeth on cheliceral retromargin in female: 1) four on left chelicera and five on right one, 2) five on both left and right chelicerae, and 3) five on left chelicera and six on right one.

### Discussion

Judging from the distributional range of *Spirioelotes zonatus* based on records in literatures (Fig. 5), this species



**Fig. 5.** Distribution and immigration route of *Spirioelotes zonatus* (Peng & Wang 1997).

seems to be originally endemic to the eastern central region of China. The route of immigration of the spider from China to Japan is presumed as follows.

In the Glover Garden and its adjoining areas, there used to be residences of some foreign traders in the period from the late Edo Era to the early Showa Era (1863–1941). Some European-style houses are still preserved at present. In

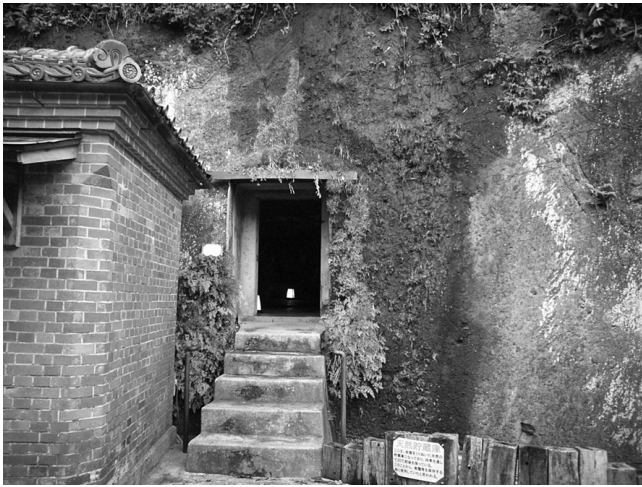


Fig. 6. Collecting site of *S. zonatus* in the Glover Garden.

those days, Nagasaki City was one of the main trading ports in Japan, and a prosperous trade was made with southeastern China, especially with Shanghai. Many imported foods were discharged from the ships. The collecting site of *S. zonatus* in the Glover Garden is limited in an artificial cave (Fig. 6), which was used at that time as the food storage by the foreign residents. Hence, it may be assumed that the spiders of *S. zonatus* came into food cargos in China and were transported and discharged at Nagasaki. Then, they could be carried to the food storage of foreign residents.

*Spiricoelotes zonatus* must be a naturalized species in Japan, which was immigrated to Nagasaki City from Shanghai or its neighboring cities of southeastern China by trading ships. The following facts supported this presumption: 1) although I surveyed in Nagasaki Prefecture for many years, no specimens of *S. zonatus* have been found from other areas except for the artificial cave of the Glover Garden, 2) *S. zonatus* has never been recorded from nearer areas to Kyushu, namely northeastern China, Korean

Peninsula, Taiwan, and Ryukyu Islands, 3) major foreign residents, who lived in adjoining areas of the collecting site, for example T. B. Glover and F. A. Ringer, stayed in Shanghai before their arrival in Nagasaki, and 4) coelotine spiders usually spread out by crawling and the long distance ballooning beyond the East China Sea is impossible for this spider. It is interesting that the range of this spider has not increased both in urban areas of Nagasaki and in nature environments around the city. The distribution and the presumptive immigration route of *S. zonatus* are shown in Fig. 5.

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